

## CLAIMS

## WHAT IS CLAIMED IS:.

1. A method for diagnosing diseases associated with activated eosinophils in a subject comprising:  
assaying for the presence of a brominated tyrosine species in a test sample of a body fluid or tissue obtained from the subject.
2. The method of claim 1 in which the test sample is selected from the group consisting of bronchoalveolar lavage, serum, plasma, urine, tissue biopsy and sputum, induced sputum, blood, pericardial fluid, pleural fluid, cerebrospinal fluid, stool, or broncho-alveolar lavage; or cells containing metabolic products of activated eosinophils and phagocytes.
3. The method of claim 1 wherein the brominated tyrosine species is selected from the group consisting of 3-bromotyrosine, 3,5-dibromotyrosine, and combinations thereof.
4. The method of claim 1 wherein the disease is asthma and the assay comprises measuring the amount of the brominated species in the test subject.
5. The method of claim 1 wherein the disease is asthma and the assay comprises determining the concentration or content of the brominated species in a test subject.
6. The method of claim 5 further comprising the step of comparing the concentration or content of the brominated species in the test sample to the concentration or content of the brominated species in corresponding samples from normal subjects lacking asthma..
7. The method of claim 4 wherein the concentration or content of the brominated species in the test sample is compared to a baseline concentration or content of the brominated species in a corresponding sample from the test subject.
8. The method of claim 1 wherein the disease is asthma and wherein the assay comprises determining the concentration or content of the brominated species in a plurality of test samples obtained at successive time intervals from the subject.
9. The method of claim 1 wherein the disease is asthma and wherein the assay comprises determining the concentration or content of the brominated species in a test sample obtained from the subject at a time prior to treatment with an anti-asthmatic drug and determining the concentration or content of the brominated species in a corresponding test sample obtained from the subject at a time following treatment with an anti-asthmatic agent.

- 1 10. The method of claim 1 wherein the presence of the brominated species in the test sample is  
2 assayed by a technique selected from mass spectrometric analysis, HPLC with electrochemical  
3 detection, HPLC with fluorescence detection following pre- or post column derivatization, Capillary  
4 Electrophoresis, and high resolution NMR spectroscopy.
- 1 11. The method of claim 1 wherein the presence of the brominated species in the sample is  
2 assayed by contacting the sample with an anti-bromotyrosine monoclonal antibody and assaying for  
3 the formation of an antigen-antibody complex between said antibody and a protein in said sample.
- 1 12. A diagnostic kit for diagnosing diseases in which activated eosinophils are present at the  
2 disease site comprising an antibody reactive with a peptide bound brominated tyrosine species..
- 1 13. The diagnostic kit of claim 11 wherein said antibody is a monoclonal antibody reactive with  
2 proteins containing a bromotyrosine selected from the group consisting of 3-bromotyrosine, 3,5-di-  
3 bromotyrosine, and combinations thereof.
- 1 14. The diagnostic kit of claim 12 further comprising a synthetic peptide or a synthetic protein  
2 containing bromotyrosine.
- 1 15. A reagent for diagnosing diseases in which activated eosinophils are present at the disease site  
2 said reagent selected from the group consisting 3-bromotyrosine, 3,5-dibromotyrosine, a peptide  
3 containing 3-bromotyrosine, a peptide containing 3,5-dibromotyrosine, and combinations thereof.
- 1 16. The reagent of claim 14 wherein said reagent is a heavy isotope labeled 3-bromotyrosine or a  
2 heavy isotope labeled 3,5-dibromotyrosine. .
- 1 17. The reagent of claim 16 wherein said reagent is labeled with  $^{13}\text{C}_6$ ,  $^2\text{H}_4$ , or  $^{13}\text{C}_9$  and  $^{15}\text{N}_1$ .
- 1 18. The method of claim 1 in which the presence the brominated tyrosine species is detected by  
2 an immunoassay which employs antibodies to 3-bromotyrosine or 3,5 di-bromotyrosine.
- 1 19. The method of claim 1 wherein the disease is associated with the presence of increased  
2 concentrations of 3-bromotyrosine or 3,5-dibromotryosine in samples from subjects having the  
3 disease relative to samples from normal subjects lacking the disease.
- 1 20. A method for diagnosing diseases associated with protein damage by brominating oxidants in a  
2 subject comprising:  
3 assaying for the presence of a brominated tyrosine species in a test sample of a body fluid or  
4 tissue obtained from the subject, wherein the brominated tyrosine species is selected from the  
5 group consisting of 3-bromotyrosine, 3,5-dibromotyrosine, and combinations thereof.